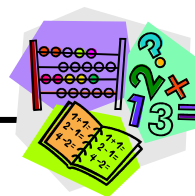


# Creating Graphs



## Selecting Graphs

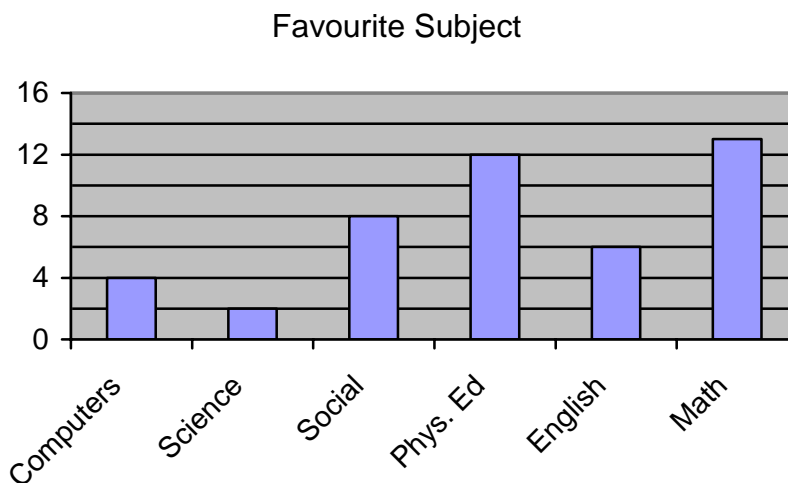
The chart lists five movies and the number of students who selected each as their favourite. The information in the chart is a snapshot and can be displayed on a bar or a circle graph (for the circle graph, percentages would need to be figured out).

Favourite Movie	
Movie	Number of Students
<i>Star Trek</i>	24
<i>Titanic</i>	16
<i>Lord of the Rings</i>	6
<i>Men In Black</i>	20
<i>Harry Potter</i>	14



Circle and bar graphs are used to compare items. For example:

Favourite Subject	Number of Students
Computers	4
Science	2
Social Studies	8
Phys. Ed.	12
English	6
Math	13

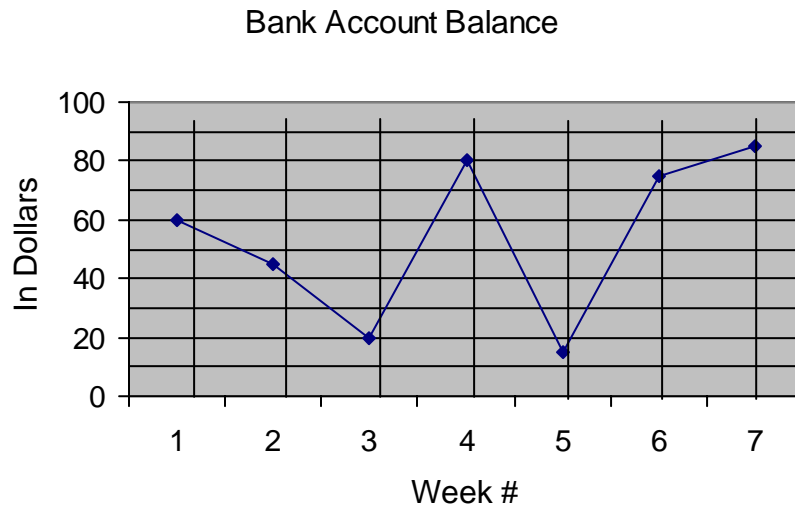


The graph shows us quickly that math and phys. ed. are the favourite subjects of this group of students.



Broken line graphs show trends or changes in one item over time.

Week	Balance (in \$)
Week 1	60
Week 2	45
Week 3	20
Week 4	80
Week 5	15
Week 6	75
Week 7	85





## Practice: Selecting Graphs

---



1. Use a variety of sources of information, such as a library, atlas, newspaper or the Internet, to locate circle and bar graphs. Discuss with classmates the type of data/information displayed on these graphs.

Write a conclusion statement about the information displayed on circle and bar graphs.

2. Look at the following survey topics. For each, state which type of graph would be best (circle, bar, broken line).
  - a) The percentage of people living in each province in Canada.
  - b) People's favourite day of the week.
  - c) The cost of renting an apartment from 1990–2000.
  - d) The amount of money that a business makes monthly for one year.
  - e) The favourite restaurants of people.
  - f) The brands of laundry detergent used.
  - g) The percentages of each ingredient in a bottle of pop.
  - h) The percentages of Albertans in different age ranges.
  - i) The amount of sunshine per day over one year.
  - j) People's favourite authors.



3. Select a partner. Brainstorm survey topics where the results could be displayed in:
  - circle graphs
  - bar graphs
  - line graphs.

## Making Bar Graphs

Bar graphs can be made using the data from charts and tables.

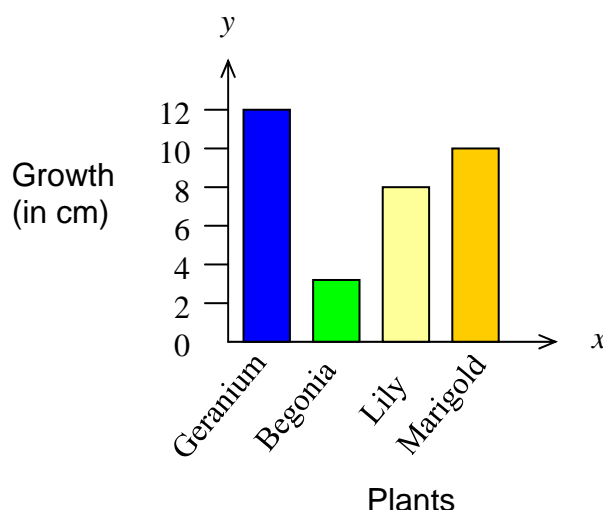
- Step 1: With a ruler, draw an  $x$ -axis (horizontal line) and a  $y$ -axis (vertical line) on a piece of graph paper.
- Step 2: Label each axis with the type of information it contains.
- Step 3: Decide what scale to use (how much each line represents), based on the range of data you want to show; e.g., if you had data with a range from 0–80 cm, you might choose an increase of 10 cm for each line.
- Step 4: Draw marks to show the intervals (spaces between each measurement) in a way that is easy to read.
- Step 5: Plot your information on the graph.
- Step 6: Draw a bar for each category.
- Step 7: Give the graph a title that explains what the data represents.

### Example

**Growth of Plants in 3 Weeks**

Plants ( $x$ -axis)	Growth ( $y$ -axis)
Geranium	12 cm
Begonia	3 cm
Lily	8 cm
Marigold	10 cm

**Growth of Plants in 3 Weeks**



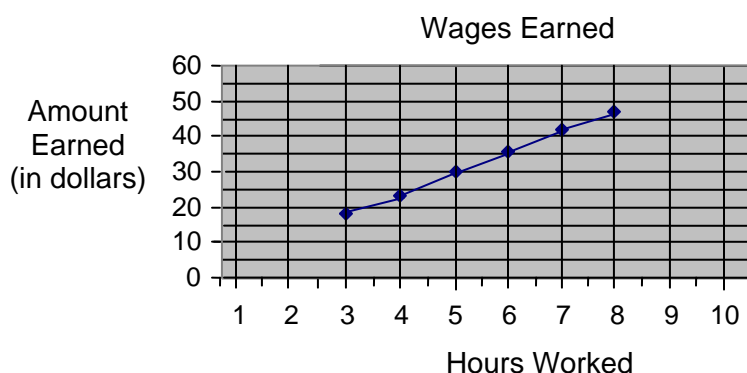
## Making Line Graphs

Line graphs can also be made using information from tables or equations.

- Step 1: With a ruler, draw an  $x$ -axis (horizontal line) and a  $y$ -axis (vertical line) on a piece of graph paper.
- Step 2: Label each axis with the type of information it contains.
- Step 3: Decide what scale to use (how much each line represents), based on the range of data you want to show; e.g., if you had data with a range from 0-80 cm, you might choose an increase of 10 cm for each line.
- Step 4: Draw marks to show the intervals (spaces between each measurement) in a way that is easy to read.
- Step 5: Plot each point by finding the appropriate spot where the  $x$ -axis and  $y$ -axis intersect. For example, for the first point, find 3 on the  $x$ -axis, then move up until you hit 18 on the  $y$ -axis. Draw your first point there.
- Step 6: Connect the dots with a line, using a ruler.
- Step 7: Give the graph a title that explains what the data represents.

### Example

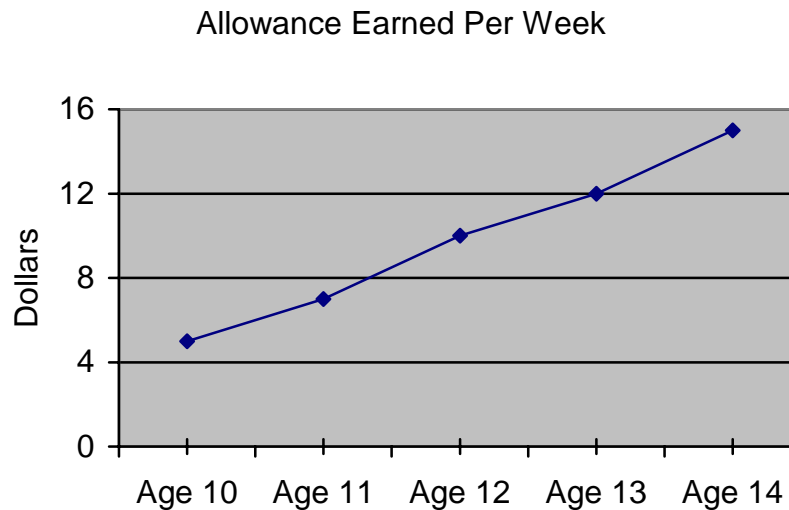
Hours Worked ( $x$ )	Amount Earned ( $y = 6x$ )
3	18
4	24
5	30
6	36
7	42
8	48



Now the pattern can be extended by continuing the line on the graph. For example, if Saul works for 10 hours, he will make \$60.00.

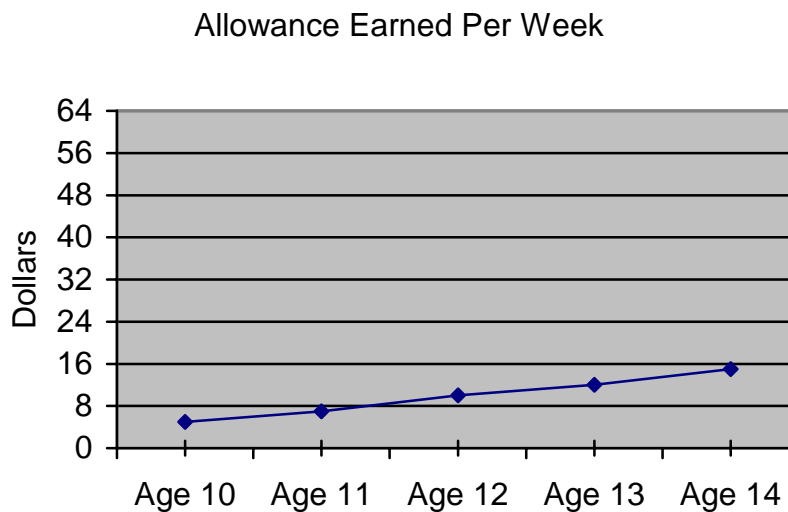
Graphs can be manipulated to change the appearance of the results of the data.

The graph below shows how one student's allowance increased over time.



The graph shows what appears to be a significant increase in allowance over 4 years.

Manipulating or changing the y-axis can make the graph look different.



Changing the y-axis makes it appear that the increase in allowance was not as great.

## Making a Circle Graph

Step 1: With a compass or tracer, draw a circle.

Step 2: Calculate the size of each category using the following percentage formula:

$$\frac{\text{Percentage of Total}}{100\%} = \frac{360}{100\%}$$

This gives you the angle you will need to draw to create a section for that category.

Step 3: Draw a straight line from the centre to the edge of the circle.

Step 4: Use a protractor to measure and mark a section for each category.

Step 5: Label and/or colour each section.

Step 6: Give the graph a title that explains what the data represents.

### Example

Shannon surveyed 200 students to gather information about cafeteria food. Her results are displayed on the chart and the circle graph. The chart shows raw data—exact numbers that have not been converted into percentages.

Favourite Cafeteria Food	Number of Students
Burgers	72
Tacos	44
Stew	34
Salad	32
Soup	18
Total number of students surveyed:	200



Shannon converted the raw data to percents to represent the data more clearly. Check out [Calculating Percents](#) for more information.

#### Burgers

$$\frac{72}{200} \div 2 = \frac{36}{100} = 36\%$$

#### Salad

$$\frac{32}{200} \div 2 = \frac{16}{100} = 16\%$$

#### Tacos

$$\frac{44}{200} \div 2 = \frac{22}{100} = 22\%$$

#### Soup

$$\frac{18}{200} \div 2 = \frac{9}{100} = 9\%$$

#### Stew

$$\frac{34}{200} \div 2 = \frac{17}{100} = 17\%$$

Shannon must then figure out how many degrees should represent each percentage. We know that a circle has 360 degrees, so:

$$\frac{36}{100} = \frac{?}{360}$$

$$36\% \times 360 \text{ degrees} \div 100 = 129.6 \quad \text{round to 130 degrees}$$

$$22\% \times 360 \text{ degrees} \div 100 = 79.2 \quad \text{round to 80 degrees}$$

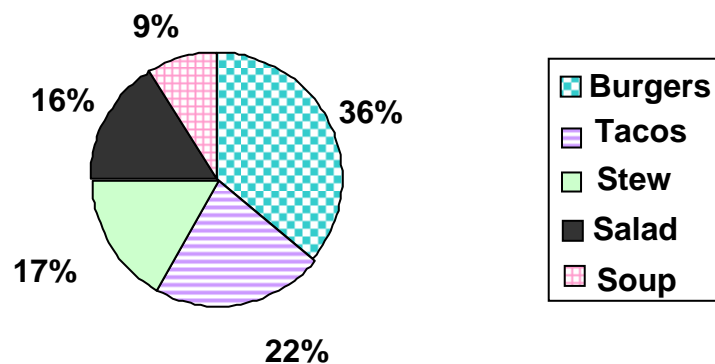
$$17\% \times 360 \text{ degrees} \div 100 = 61.2 \quad \text{round to 61 degrees}$$

$$16\% \times 360 \text{ degrees} \div 100 = 57.6 \quad \text{round to 58 degrees}$$

$$9\% \times 360 \text{ degrees} \div 100 = 32.4 \quad \text{round to 32 degrees}$$

Shannon must then measure and draw in the degrees on her circle graph.

**Favourite Cafeteria Food**







## Practice: Making Graphs

1. Use the data in the chart to make a broken **line graph** using a computer spreadsheet or a piece of graph paper.



Number of Students Absent From School	
Day	Total Absent
Monday	15
Tuesday	12
Wednesday	8
Thursday	9
Friday	16

2. The table shows the amount of snowfall in Banff during one week.

Precipitation in Banff	
Day of the Week	Snowfall (in cm)
Sunday	27
Monday	24
Tuesday	16
Wednesday	18
Thursday	5
Friday	22
Saturday	6

Select an appropriate graph type and make a graph using technology or a pencil and graph paper.

3. The table shows the amount of tips earned by a server.

Tips Earned in One Week	
Day of the Week	Tips Earned
Sunday	\$52.00
Monday	\$18.00
Tuesday	\$16.00
Wednesday	\$25.00
Thursday	\$48.00
Friday	\$64.00
Saturday	\$76.00

Use technology or pencil and paper to create a bar or broken line graph to display the information in the above chart.

4. People were surveyed to identify their favourite type of potato. Survey results are displayed in the chart.

Favourite Type of Potato	
Type of Potato	# People
Stuffed	27
Mashed	32
Baked	16
French Fries	40
Roasted	12

Use technology or graph paper and pencil to create a graph using the information in the chart.

5. Use the table below to complete the following questions.

$x = \text{days}$	attendance
1	28
2	24
3	30
4	36

- Plot the information from the table on a graph.
- Mark the  $x$  values along the horizontal line ( $\leftrightarrow$ ) of the graph.
- Mark the  $y$  axis with numbers from 20 to 36 (even numbers only). This is called your scale.
- Plot the attendance values on the graph with a point ( $\bullet$ ).
- Use a straightedge and join the points.
- Create another graph with a different scale on the  $y$  axis: 5, 10, 15, 20, 25, 30, 35, 40
- Compare the two graphs.

6. With a partner, survey friends, family and/or classmates on a topic of interest. Create a graph using technology to display the data. Present your graph to your class or teacher and be prepared to explain your findings.

